

1 WHAT IS CLAIMED IS:

- 1 1. A screen assembly comprising:
2 a screen formed of open mesh ventilation material;
3 a plurality of bar members secured together to form a screen
4 frame, each of the plurality of bar members including a tapered slot
5 extending at least substantially along a front side of the bar member, the
6 front sides of the members defining a plane containing a portion of the
7 screen lying between the plurality of bar members, an opening of the tapered
8 slot being in the plane of the front side, a base of the tapered slot being
9 substantially parallel and offset from the front side, and sides of the tapered
10 slot being generally tapered inward from the base to the opening of the slot;
11 wherein the screen is spread across the front side of the screen
12 frame and tensioned by the tapered slot along the front side of the
13 respective bar member, encapsulated by a curable compound applied within
14 the tapered slot of each of the plurality of bar members, and bonded by the
15 compound to the tapered slot of the respective bar member.
- 1 2. The assembly of claim 1, wherein the compound is an
2 ultraviolet curable compound.
- 1 3. The assembly of claim 2, wherein the ultraviolet curable
2 compound is cured with ultraviolet light having a wavelength in the range of
3 about 300 to about 450 nanometers.
- 1 4. The assembly of claim 2, wherein the ultraviolet curable
2 compound is cured with ultraviolet light for a time in the range of about 1.0
3 to about 3.0 seconds.

1 5. The assembly of claim 1, wherein the open mesh ventilation
2 material comprises glass fiber strands coated with a polyvinyl chloride
3 material.

1 6. The assembly of claim 1, wherein the compound is applied as a
2 film to provide a layer having a thickness of about 0 to about 0.1 inches.

1 7. The assembly of claim 1, wherein the compound is applied as a
2 bead to provide a layer having a thickness of about 0 to about 0.1 inches.

1 8. The assembly of claim 1, wherein the compound is applied to
2 provide a layer having a thickness of about 0.015 to about 0.0425 inches.

1 9. The assembly of claim 1, wherein the screen is encapsulated so
2 that the compound lies at or above a top surface of the screen at the base of
3 the tapered slot.

1 10. The assembly of claim 1, wherein the screen is encapsulated so
2 that a top surface of the screen positioned at the base of the tapered slot
3 lies at or beneath a top surface of the compound at the base of the tapered
4 slot.

1 11. The assembly of claim 1, wherein the screen is encapsulated so
2 that an outer surface of the screen located along a side of the tapered slot
3 lies beneath an outer surface of the compound located along the side of the
4 tapered slot.

1 12. A screen assembly comprising:
2 a screen formed of open weave material;
3 a screen bar frame having a mounting area thereon;
4 wherein the screen is spread across the screen bar frame and
5 tensioned by the mounting area, encapsulated by an ultraviolet curable
6 adhesive along the mounting area, and bonded by the ultraviolet curable
7 adhesive to the mounting area.

1 13. The assembly of claim 12, wherein the ultraviolet curable
2 adhesive is cured with ultraviolet light having a wavelength in the range of
3 about 300 to about 450 nanometers.

1 14. The assembly of claim 12, wherein the ultraviolet curable
2 adhesive is cured with ultraviolet light for a time in the range of about 1.0 to
3 about 3.0 seconds.

1 15. The assembly of claim 12, wherein the screen bar frame
2 comprises a plurality of bar members secured together to form a screen
3 frame.

1 16. The assembly of claim 15, wherein the mounting area
2 comprises a tapered slot extending at least substantially along a front side of
3 the bar members, the front sides of the members defining a plane containing
4 a portion of the screen lying between the plurality of bar members, an
5 opening of the tapered slot being in the plane of the front side, a base of the
6 tapered slot being substantially parallel and offset from the front side, and
7 sides of the tapered slot being generally tapered inward from the base to the
8 opening of the slot.

1 17. The assembly of claim 16, wherein the screen is encapsulated
2 so that a top surface of the screen positioned at the base of the tapered slot
3 lies at or beneath a top surface of the adhesive at the base of the tapered
4 slot.

1 18. The assembly of claim 16, wherein the screen is encapsulated
2 so that an outer surface of the screen located along a side of the tapered
3 slot lies beneath an outer surface of the adhesive located along the side of
4 the tapered slot.

1 19. A method for manufacturing a screen assembly, comprising:
2 constructing a screen bar frame having a tapered slot extending
3 at least substantially along a front side of the screen bar frame;
4 spreading a screen formed of open mesh ventilation material
5 over the screen bar frame so that a portion of the screen is disposed within
6 the tapered slot;
7 applying a predetermined quantity of curable compound onto
8 the portion of the screen disposed within the tapered slot; and
9 curing the curable compound to mechanically interlock the
10 screen to the screen frame at a predetermined tension.

1 20. The method of claim 19, wherein the screen is tensioned while
2 the compound is being cured.

1 21. The method of claim 20, wherein the applying step and the
2 curing step are done substantially at the same time.

1 22. The method of claim 19, further comprising trimming extra
2 screen material after the screen is disposed within the tapered slot.

1 23. The method of claim 22, wherein the trimming step, applying
2 step, and curing step are each done substantially at the same time.

1 24. The method of claim 19, wherein the compound is an ultraviolet
2 curable compound.

1 25. The method of claim 24, wherein the ultraviolet curable
2 compound is cured with ultraviolet light having a wavelength in the range of
3 about 300 to about 450 nanometers.

1 26. The method of claim 24, wherein the ultraviolet curable
2 compound is cured for a time in the range of about 1.0 to about 3.0
3 seconds.

1 27. The method of claim 19, further comprising encapsulating the
2 screen with the compound so that a top surface of the screen positioned at
3 the base of the tapered slot lies at or beneath a top surface of the compound
4 at the base of the tapered slot.

1 28. The method of claim 19, further comprising encapsulating the
2 screen with the compound so that an outer surface of the screen located
3 along a side of the tapered slot lies beneath an outer surface of the
4 compound located along the side of the tapered slot.

1 29. A method for manufacturing a screen assembly, comprising:
2 constructing a screen bar frame having a mounting area
3 thereon;
4 spreading a screen formed of open mesh ventilation material on
5 the mounting area;
6 applying a predetermined quantity of an ultraviolet curable
7 adhesive onto the mounting area; and
8 curing the adhesive to mechanically interlock the screen to the
9 mounting area.

1 30. The method of claim 29, wherein the adhesive is cured with
2 ultraviolet light.

1 31. The method of claim 30, wherein the adhesive is cured by
2 ultraviolet light having a wavelength in the range of about 300 to about 450
3 nanometers.

1 32. The method of claim 30, wherein the adhesive is cured for a
2 time in the range of about 1.0 to about 3.0 seconds.

1 33. The method of claim 29, wherein the constructing step includes
2 forming a screen bar frame with a mounting area comprising a tapered slot
3 extending at least substantially along a front side of the screen bar frame.

1 34. The method of claim 33, wherein the spreading step comprises
2 positioning the screen over the screen bar frame so that a portion of the
3 screen is disposed within the tapered slot.

1 35. The method of claim 34, further comprising trimming extra
2 screen material after the screen is disposed within the tapered slot.

1 36. The method of claim 35, wherein the trimming step, applying
2 step, and curing step are each done substantially at the same time.

1 37. The method of claim 29, wherein the applying step and the
2 curing step are done substantially at the same time.

1 38. The method of claim 29, wherein the curing step further
2 comprises tensioning the screen at substantially the same time that the
3 adhesive is being cured.

1 39. A screen assembly apparatus for securing a screen
2 frame, the apparatus comprising:

3 a plurality of adjustable guides for positioning a screen frame in
4 a pre-assembly position along a base;

5 a vacuum device for removably securing the screen frame to the
6 base located within the screen assembly apparatus in alignment with
7 dispensing heads;

8 a screen advance for moving the screen along the base in order
9 to attach the screen to the screen frame;

10 wherein the dispensing heads are configured to engage the
11 screen frame as it moves from the pre-assembly position to a post-assembly
12 position and perform multiple functions thereon including: (a) position the
13 screen within a slot extending at least substantially along a front side of the
14 screen frame, (b) apply an ultraviolet curable adhesive into the slot, (c) cure
15 the ultraviolet curable adhesive with ultraviolet light, and (d) trim excess
16 screen material along the front side of the screen frame.

1 40. The apparatus of claim 39, wherein the dispensing heads are
2 configured to perform the multiple functions at substantially the same time.

1 41. The apparatus of claim 39, further comprising an ejection
2 device for ejecting the screen frame from the screen assembly apparatus
3 after the screen has been secured to the screen frame.

1 42. The apparatus of claim 41, wherein the ejection device
2 comprises belted tangs that push the screen assembly from the screen
3 assembly apparatus.

1 43. The apparatus of claim 39, further comprising a computer
2 program product including computer useable medium having computer logic
3 for enabling at least one processor in a computer system to control operation
4 of the screen being secured to the screen frame.

1 44. The apparatus of claim 39, wherein the apparatus will
2 accommodate different sized screen frames and screens.

1 45. The apparatus of claim 39, wherein the screen advance
2 comprises unwind and rewind reels so that the screen advance may operate
3 in multiple directions.

1 46. The apparatus of claim 45, wherein the screen advance
2 comprises drive locating rollers that position the screen vertically with
3 respect to the unwind and rewind reels.

1 47. The apparatus of claim 39, further comprising a plurality of high
2 speed linear motors that provide power to a material indexer that positions
3 the screen across the base.

1 48. The apparatus of claim 39, further comprising an overhead
2 ultraviolet light source for providing additional curing of the adhesive.

1 49. The apparatus of claim 39, wherein the vacuum device
2 comprises locating tangs and stops for positioning the screen frame with
3 respect to the screen assembly apparatus.

1 50. The apparatus of claim 49, wherein the vacuum device further
2 comprises pre-stressing tangs to pre-stress the screen frame to the proper
3 dimensional configuration

1 51. The assembly of claim 39, wherein the screen is tensioned to
2 the screen frame slot by way of the dispensing heads.

1 52. The assembly of claim 51, wherein the dispensing heads
2 comprise seating tools configured to rotate between a first position and a
3 second position.

1 53. The assembly of claim 52, wherein the seating tools are in the
2 first position for insertion into and removal from the screen frame slot.

1 54. The assembly of claim 53, wherein the seating tools are rotated
2 to the second position after being inserted into the screen frame slot for
3 seating the screen and applying the adhesive.

1 55. The assembly of claim 54, further comprising seating wheels
2 that follow the dispensing heads along the screen frame slot after adhesive is
3 applied within the slot.

1 56. A screen assembly apparatus for securing a screen to a screen
2 frame, the assembly comprising:

3 a plurality of adjustable guides for positioning a screen frame in
4 a pre-assembly position along a base;

5 a screen advance for moving the screen along the base in order
6 to attach the screen to the screen frame; and

7 dispensing heads for engaging the screen frame and performing
8 multiple functions thereon as the screen frame moves from a pre-assembly
9 position to the post-assembly position, the multiple functions including
10 positioning the screen within a slot extending at least substantially along a
11 front side of the screen frame, and securing the screen within the slot by
12 way of an ultraviolet curable adhesive.

1 57. The apparatus of claim 56, wherein positioning the screen
2 within the slot comprises tensioning the screen by way of the dispensing
3 heads.

1 58. The assembly of claim 57, wherein securing the screen within
2 the slot comprises curing the adhesive with ultraviolet light.

1 59. The assembly of claim 58, wherein the adhesive is applied
2 within the tapered slot by the dispensing heads.

1 60. The assembly of claim 59, wherein the dispensing heads
2 comprise seating tools configured to rotate between a first position and a
3 second position.

1 61. The assembly of claim 60, wherein the seating tools are in the
2 first position for insertion into and removal from the slot.

1 62. The assembly of claim 61, wherein the seating tools are rotated
2 to the second position after the dispensing heads are inserted into the
3 tapered slot for seating the screen and applying the adhesive.

1 63. The assembly of claim 62, further comprising a seating wheel
2 that follows the dispensing head along the tapered slot after adhesive is
3 applied within the tapered slot.

1 64. The apparatus of claim 56, wherein the multiple functions of
2 the dispensing heads further comprise trimming excess screen material along
3 the front side of the screen frame.

1 65. The apparatus of claim 56, wherein the dispensing heads are
2 configured to perform the multiple functions at substantially the same time.

1 66. The apparatus of claim 56, further comprising a vacuum device
2 for removably securing the screen frame to the base located within the
3 screen assembly apparatus in alignment with the dispensing heads.

1 67. The apparatus of claim 66, wherein the vacuum device
2 comprises locating tangs and stops for positioning the screen frame with
3 respect to the screen assembly apparatus.

1 68. The apparatus of claim 56, wherein the adhesive is cured with
2 ultraviolet light having a wavelength of about 300 to about 450 nanometers.

1 69. The apparatus of claim 56, further comprising an ejection
2 device for ejecting the screen frame from the screen assembly apparatus by
3 way of belted tangs that push the screen frame from the screen assembly
4 after the screen has been secured to the screen frame.

1 70. The apparatus of claim 56, further comprising a computer
2 program product including computer useable medium having computer logic
3 for enabling at least one processor in a computer system to control operation
4 of the screen being secured to the screen frame.